Bladder Pain Syndromes, Chronic pelvic pain, voiding dysfunction and Overactive Pelvic Floor

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Adapted from Chapter 5 (Female Interstitial Cystitis/Bladder Pain Syndrome; authors: Mauro Cervigni, Andrea Morciano, Giuseppe Campagna) and Chapter 8 (Voiding Dysfunction; author: Asnat Groutz) in “The Overactive Pelvic Floor”; editors: Anna Padoa and Talli Rosenbaum, Springer Editions, in press.

Bladder Pain Syndrome/Interstitial Cystitis (BPS/IC)

Definition

The National Institute of Diabetes and Digestive Kidney Diseases (NIDDK) established a set of consensus criteria, which were developed to ensure the comparability of patients enrolled in clinical studies. These included:

• Hunner’s ulcers

• any two of the following:
  – pain on bladder filling, relieved by emptying
  – suprapubic, pelvic, urethral, vaginal, or perineal pain for 9 months
  – glomerulations on endoscopy or upon hydrodistension under spinal or general anesthesia.

Epidemiology

680 per 100,000 (0.68%) for a probable BPS/IC diagnosis and 300 per 100,000 (0.3%) for a definite one.

Pathophysiology

• Mastocytosis
Dysfunctional Bladder Epithelium
- Neurogenic Inflammation
- Reduced Vascularization
- Autoimmunity

**IC/BPS and OPF**
- Inflammation, pain or of pelvic visceral trauma may transfer noxious stimuli to the sacral cord, which can result in pelvic floor muscle dysfunction due to sacral nerve hypersensitivity and initiate a sacral cord wind-up effect.
- The “Guarding Reflex” is a viscero-muscular reflex activated with the aim to increase the tone of the pelvic floor during routine daytime activity. The afferent autonomic bombardment occurring in BPS/IC patients may enhance and maintain such guarding reflex, resulting in pelvic floor overactivity.

**Diagnosis**

<table>
<thead>
<tr>
<th>Disease type</th>
<th>Confusable diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bladder diseases</strong></td>
<td>Overactive bladder</td>
</tr>
<tr>
<td></td>
<td>Neurogenic bladder</td>
</tr>
<tr>
<td></td>
<td>Radiation cystitis</td>
</tr>
<tr>
<td></td>
<td>Bladder calculus</td>
</tr>
<tr>
<td></td>
<td>Bladder cancer</td>
</tr>
<tr>
<td><strong>Prostate and urethral diseases</strong></td>
<td>Benign prostatic hypertrophy</td>
</tr>
<tr>
<td>Conditions</td>
<td>Prostate cancer</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td><strong>Genitourinary infections</strong></td>
<td>Bacterial cystitis</td>
</tr>
<tr>
<td><strong>Gynecologic diseases</strong></td>
<td>Endometriosis</td>
</tr>
<tr>
<td><strong>Other conditions</strong></td>
<td>Polyuria</td>
</tr>
</tbody>
</table>

**Symptoms and signs**

Pain symptoms are often vague and poorly localized.

Pain is typically exacerbated by pelvic floor muscle activities like sexual intercourse or voiding.

The pressure arising from pelvic floor overactivity may be perceived as a need to void.

A lubricated cotton tip applicator is then gently used to evaluate for signs of allodynia and vulvodynia.

Active trigger points are often identified as exquisitely tender areas palpable as a small 3-6 mm nodule.

**Ancillary testing**
- Electromyography
- Urodynamic testing
- Defecography

**Treatment**

- Behavioural modifications:
  - bladder training, diary-timed voiding
  - dietary changes
- Physical Therapy:
  - Biofeedback and soft tissue massage
  - Manual physical therapy to pelvic floor myofascial trigger points
  - Modified Thiele intravaginal massage

### Oral medications for treatment of BPS/IC

<table>
<thead>
<tr>
<th>Drug</th>
<th>RCT</th>
<th>Success (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amitriptyline; tricyclic antide</td>
<td>Yes</td>
<td>42</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Yes</td>
<td>48</td>
</tr>
<tr>
<td>Cimetidine</td>
<td>Yes</td>
<td>65</td>
</tr>
<tr>
<td>Hydrocortisone</td>
<td>No</td>
<td>80</td>
</tr>
<tr>
<td>Ciclosporin</td>
<td>No</td>
<td>90</td>
</tr>
<tr>
<td>Drug</td>
<td>RCT</td>
<td>Success (%)</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Hydroxyzine</td>
<td>Yes</td>
<td>31</td>
</tr>
<tr>
<td>l-Arginine</td>
<td>Yes</td>
<td>not effective</td>
</tr>
<tr>
<td>Nifedipine</td>
<td>No</td>
<td>87</td>
</tr>
<tr>
<td>Quercetin</td>
<td>No</td>
<td>92</td>
</tr>
<tr>
<td>Sodium pentosanpolysulfate</td>
<td>Yes</td>
<td>33</td>
</tr>
<tr>
<td>Suplatast tosilate</td>
<td>No</td>
<td>86</td>
</tr>
</tbody>
</table>

**Intravesical medications for treatment of BPS/IC: results**

<table>
<thead>
<tr>
<th>Drug</th>
<th>RCT</th>
<th>Success (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMSO</td>
<td>Yes</td>
<td>70</td>
</tr>
<tr>
<td>BCG</td>
<td>Yes</td>
<td>Conflicting data</td>
</tr>
<tr>
<td>Resiniferatoxin</td>
<td>Yes</td>
<td>No proven efficacy</td>
</tr>
<tr>
<td>Hyaluronic aid</td>
<td>Yes</td>
<td>No proven efficacy</td>
</tr>
<tr>
<td>Heparin</td>
<td>No</td>
<td>60</td>
</tr>
<tr>
<td>Chondroitin Sulfate</td>
<td>No</td>
<td>33</td>
</tr>
<tr>
<td>Lidocaine</td>
<td>No</td>
<td>65</td>
</tr>
<tr>
<td>PPS</td>
<td>Yes</td>
<td>Possible efficacy</td>
</tr>
</tbody>
</table>

Adapted from P. Hanno

**Procedural interventions:**
- Trigger point injections
- Botulinum Toxin
- Sacral nerve neuromodulation
- Laser resection, augmentation cystoplasty, cystolysis, cystectomy, and urinary diversion may be the ultimate option for refractory BPS/IC patients
REFERENCES


Voiding dysfunction of functional origin

Prevalence
- Data are scarce.
- Previous studies reported 2-25% prevalence rates among women referred for evaluation of LUTS

Diagnosis
- No standard definitions.
- Pressure-flow study: an objective urodynamic examination considered to be the best method to assess the voiding phase of the micturition cycle.
- Uroflowmetry is a composite measure of the interaction between the pressure generated by the detrusor and the resistance offered by the urethra.
- EMG
- Video-urodynamic testing

Functional bladder outlet obstruction syndromes

Hinman syndrome
- Initially described in children with a non-neurogenic, neurogenic bladder. Presentation: increased daytime frequency, urgency, urinary incontinence, recurrent urinary tract infections, or occasionally, encopresis.
- Signs of obstructive uropathy, such as trabeculated bladder, elevated postvoid residual urine volume, hydronephrosis, and vesicoureteral
reflux, in the absence of any identifiable neurological or obstructive abnormality.

• Usually acquired after toilet training, reaches its peak of destructiveness in late childhood, and tends to resolve after puberty.
• Groutz et al suggested the term “learned voiding dysfunction” and used the following clinical and urodynamic criteria to establish the diagnosis:

1) a suggestive clinical history, i.e.: LUTS and difficulty in voiding in public places, or during uroflowmetry/urodynamics, having to concentrate, relax, touch genitalia, listen to running water, etc.
2) intermittent “free” uroflow pattern
3) exclusion of neurological disorders, or anatomical causes of bladder outlet obstruction
4) demonstration of typical external urethral sphincter contractions during micturition with either needle EMG, or fluoroscopic visualization of the urethra during voiding

• Contrary to children, in whom the main subjective hallmarks of the syndrome are urinary incontinence and recurrent urinary tract infections, adult patients present mainly with obstructive and/or irritative symptoms, while urinary incontinence is less prominent

Treatment

• Suggestion and bladder retraining, bladder drill, and biofeedback
• Pharmacologic therapy to treat detrusor overactivity, obtain striated muscle relaxation, or to inhibit contraction of the α-adrenergic innervated bladder neck.
• Uroflowmetry biofeedback
• Botulinum toxin urethral sphincter injection to restore bladder emptying in patients with voiding dysfunction has also been used with some success, but data are limited
• Sacral neuromodulation for LUTS

Although potentially successful in more than 80% of cases, the treatment can span 6 weeks to several years with occasional relapses, requiring cooperation and determination on the part of the child and her/his family

Fowler’s syndrome

• Described as voiding dysfunction due to abnormal EMG activity of the urethral sphincter among young women, 64% of whom also had polycystic ovaries
• The nature of the EMG activity was such that it suggested a muscle membrane disorder and, therefore, a primary disorder of the sphincter
relaxation rather than inappropriately timed sphincter activity that occurs in neurogenic detrusor-sphincter dyssynergia

- Other investigators reported increased urethral pressure profile and increased sphincter volume on ultrasound in these patients [45]. It was therefore speculated that the abnormal activity in the urethral rhabdosphincter leads to hypertrophy of these myofibers

- Urinary retention in patients with Fowler's syndrome is unlikely to resolve without treatment, and sacral neuromodulation is the only intervention that has been demonstrated to restore voiding

REFERENCES

